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Evaluation (Insects)

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ENVIRONMENTAL IMPACT EVALUATION
SAN BERNARDINO, SAN JACINTO AND WRIGHTWOOD ZONES OF INFESTATION

INTRODUCTION

Timber stands in the San Bernardino National Forest harbor chronic populations of California flatheaded borer and bark beetles in the Dendroctonus and Ips genera. Insects continue to be a problem because of the stress factors placed on southern California forests. Some stresses are (1) smog and other forms of pollution, (2) intense recreation use, (3) urbanization, (4) lowering water table, (5) fires, and (6) drought condition from 1969 through 1972.

Harmful forest insects like forest fires must be dealt with on a continual basis as they occur. Therefore, a maintenance control project was developed to suppress insect pests to a tolerable level. The project provides an integrated approach to insect control. One part of maintenance control is direct control, i.e., the infested trees will be logged, removed by woodcutters or felled and sprayed with an insecticide.

In large infestations the best method to suppress the beetle populations is by removal of infested material through logging and fuelwood cuts. Large volumes of infested material are removed, treatment expenses are kept low, and need for chemical control is minimized.

Infested trees adjacent to structures and in or near campgrounds or other special or high use sites do not lend themselves well to removal through logging or fuelwood cuts. Yet these infested trees, though only a small percentage of the total, are precisely those with the highest priority for control because of their proximity to other high value uninfested pine. Chemical treatment with an insecticide is best suited for these problem areas. The insecticide lindane is registered and recommended by the Forest Service for California flatheaded borer and bark beetle control in California. Individual infested trees are felled, bucked and limbed and the bark sprayed with a 1.5 percent solution of lindane and diesel oil.

This evaluation primarily discusses the impact of the lindane-diesel oil treatment on the environment when used to treat insect-infested trees.

I. ENVIRONMENTAL IMPACT

Lindane spray will be applied in low dosages to individual felled trees. Lindane-diesel oil forms a tissue deposit (no lindane on bark surface), so environmental contamination will be kept to a minimum. One of the major concerns of organochlorine compounds, such as lindane, is that it may be transferred in the food chain through a phenomena called biological magnification. Dr. Francis Gunther (personal communication, Branch of Pest Control, Region 5), Chemist and Toxicologist, at the University

Brown and rainbow trout were all killed by exposure to 0.05 ppm of lindane, but bluegills have survived 0.45 ppm of 12 percent lindane. However, bass and bluegill fingerlings suffered 50 percent mortality at 0.1 ppm of the same formulation. (Rudd, 1956) Four species of fish were exposed to water containing 0.03 ppm lindane. Two days after termination of exposure, the fish had eliminated 90 percent of the lindane. (Gakstatter and Weiss, 1967)

Birds. Numerous tests have been made feeding various birds on a diet of certain percentages of lindane. A 10 percent mortality of pheasants resulted from eating grain treated with one and two-thirds ounces of 75 percent lindane per 100 pounds over a 20-day period. However, other investigators were unable to detect noteworthy changes in the bird population of a 40 hectare pasture and woodland treated with 10 percent BHC (10 percent gamma) at approximately 50-70 pounds per acre. This application is about twice that normally employed. In addition, considerable field observation and experimentation in Germany have led essentially to the same conclusion. The small amounts of BHC that a wild bird could ingest would be insufficient to cause harm, due to the rapid disintegration of the material (BHC) within the animal body. (Rudd, 1956)

In summary, the National Academy of Sciences (1969), indicates that field applications of lindane have no toxic effect on birds.

Animals. The chronic toxicity of BHC, with the exception of the beta isomer (this isomer not in lindane) is relatively low. Technical BHC and lindane have been rated as one half and one quarter, respectively, the toxicity of DDT. Minimal storage, rapid elimination from the body and lesser degree of tissue damage are the criteria for this rating. (Lehman, 1950)

According to the National Academy of Sciences (1969) mammals metabolize lindane quite rapidly to trichlorobenzenes and phenols, which are excreted, and thus accumulate very little in the body fat. Hence, in mammals it has a low oral toxicity. (O'Brien, 1967)

G. Man

The U. S. Department of Health, Education and Welfare reports that there have been no confirmed cases of systemic poisoning in man as a result of repeated exposure to BHC (comparable to lindane). A Roumanian study showed no ill effects from massive inhalation of DDT plus lindane in a forest spraying operation; some workers inhaled 21 mg/kg of DDT as well as 6 mg/kg of lindane daily for 30 days. (O'Brien, 1967) Lindane is absorbed through the skin and other portals. Lindane has the highest mammalian toxicity but is also rapidly excreted by the kidneys and hence does not accumulate extensively. It therefore has the lowest toxicity on repeated dosages. (Hayes, 1963)

H. Wilderness Areas

There are no wilderness areas in the project.

II. ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

A temporary reduction of certain beneficial and associated insects as well as some soil arthropods is probable. Two common predators of the western pine beetle, Enoclerus lecontei and Temnochila chlorodia, are quite easily killed by lindane. (Swain, 1968)

III. ALTERNATIVES TO THE PROPOSED ACTION

A. Log Infested Trees

This method is very desirable in low use areas but difficult in recreation and heavily urbanized areas. Nevertheless, an all-out effort will be made to log infested trees in 1973.

B. Removal of Infested Trees by Woodcutter

Usually only a small number of trees can be handled in this manner as it is difficult to remove the trees before insect emergence. Another problem is that the infested material must be removed from the forest environment if the treatment is to be effective. Hence, this precludes the use of local woodcutters.

C. Fell, Peel and Burn Infested Trees

The fire hazard in southern California generally will not permit this type of treatment. Also the effects of charred debris and scorched vegetation is undesirable in most of the areas. Local Air Pollution Control Board ordinances prohibit burning in some areas.

D. Use Ethylene Dibromide Instead of Lindane

Ethylene dibromide is a fumigating insecticide and has limited effectiveness, particularly in cold weather. Because of its short residual life it will not protect the uninfested portions of treated trees from attack by forest insects. Ethylene dibromide poses a greater hazard to treatment crews than does lindane as it is notorious for causing skin irritations resulting from direct contact. Breathing its fumes causes lung irritation.

E. Discontinue Insect Control Work in the Area

This should be regarded only as a theoretical alternative as it would have an intolerable adverse effect on the land value and the forest resource that people value for temperature modification, recreation, esthetics, shade and timber production.

IV. IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

There are no irreversible commitments except the finality of cutting a tree which would soon become a snag. Some snags always remain for wildlife habitation. Also, tree regeneration may take place in areas where trees have been cut.

V. CONSULTATION WITH OTHERS

There is consultation on a special and continuing basis with State agencies, institutions of high learning, and other Federal agencies as well as Forest Service personnel. Some of the agencies involved are the California Department of Food and Agriculture, California Division of Forestry, California Department of Fish and Game, Fish and Wildlife Service, and Pacific Southwest Forest and Range Experiment Station. Institutions consulted include San Diego State University and the University of California at Berkeley and Riverside.

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